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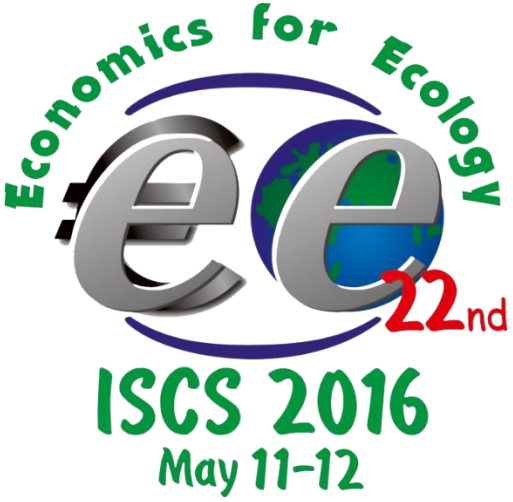

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ECONOMICS AND ENVIROMENTAL PROTECTION IN THE INDUSTRIAL REGION

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Formation of regional environmental and economic policies must be accompanied by a rise in the role of environmental factors in the development of individual regions that are in crisis, given the integrated assessment of natural assimilation of anthropogenic emissions and waste, available natural resources, the level of development of productive forces and geographic location. Condition of ecology in some industrial cities that are situated in the central and eastern regions of the country, continues to deteriorate as a result of depreciation of fixed assets and nature and lack of funding for environmental protection.

Dniprovsky industrial region is one of the most polluted in Ukraine. Emissions from industrial enterprises exert a significant impact on the environment. The most severe contamination observed in Dnipropetrovsk, Dniprodzerzhynsk and Kryvyi Rih. Dniprodzerzhynsk has a special place, where in the area of 152 km^2 and the number of residents 252.0 thousands people, emissions of harmful substances are >490 kg / human., which is 25 times more than in the Dnipropetrovsk region.

One of the most effective ways of solving environmental problems of the city is fundamental renewal of existing production facilities, commissioning of new modern technological equipment including in him the aspiration-gas treatment devices.

Iron&Steel Works is the main pollutant of the city, with the number of emissions 110 thousand tons/year (93% of the citywide) of which 76,7 tonnes/year takes sinter plant.

Sinter plant is the largest polluter of the environment by emissions (82% of all emissions in the plant) and therefore the most attention in the

future plans of the technical development of the plant is paid to its reconstruction and new construction.

Construction of a new sinter plant is planned with capacity of 11 mln. tons/year of high-quality sinter with auxiliary facilities and the reduction of emissions to 8-10 thousands tons/year. The existing sinter plant consisting of 6-sinter output of operation and dismantled. Thus eliminated the main source of harmful emissions.

Construction of the complex expected in stages in 3-phase with the provision of modern aspiration-gas cleaning equipment (system gas cleaning MEROS*), which will provide the concentration of harmful substances in the gases emitted below the permissible limits and will make up: the solids on average 5-25 mg/nm^3 and sulfur oxides by - 500 mg/nm^3.

Emissions of lead, mercury, dioxide, furan and volatile substances will be reduced by 97-99%, which meets the requirements of ISO 1400, EU BAT and other regulations.

Ukraine has a system of charges for air pollution (stationary and mobile sources), water, solid waste placement, damage to plants and animals, natural areas, emergency environmental pollution and so on.

The fees for air emissions from stationary sources of pollution ($П_{ат}$) at the limit defined by the formula [1, 2]:

$$П_{ат} = \sum_{i=1}^{n} (Н_{iп} \cdot М_{iф} + К_{iп} \cdot Н_{iп} М_{iв}) \cdot К_{т,} \cdot К_{iнд}$$

a) fee for dust emissions into the atmosphere by the old sinter plant:

$$П_{ат} = (111{,}26 \cdot 700 + 5 \cdot 111{,}26 \cdot 13300) \cdot 1{,}69 \cdot 1{,}2 = 15162691{,}0 \text{ UAH/year}$$

b) fee for dust emissions into the atmosphere after the launch of a new sinter plant:

$$П_{ат} = (111{,}26 \cdot 700) \cdot 1{,}69 \cdot 1{,}2 = 157945{,}44 \text{ UAH/year}$$

Mass emissions of old and new sinter plant using CO combustion in the boiler CHP, partial capture SO_2 i NO_2, and payment for environmental pollution are shown in the table 1.

Reduction (using combustion CO):

$$G = G_п - G_э = 76700 - 16100 = 60600 \text{ tones/year}$$

Environmental and economic benefits from reduced payments for air pollution:

$$Е_{ат} = Е_п - Е_{эф} = 183673759 - 27768330 = 155908429{,}0 \text{ UAH/year}$$

Table 1 - Weight reductions and fee for pollution

Substance and collection, UAH/tons	Emissions to the atmosphere after purification, tons/year*	The fee for emissions - old sinter plant, UAH/year	The fee for emissions - new sinter plant, UAH/year
Dust - 111,26	14000 / 700	15162691,0	157945,0
CO - 74,17	52000 / 10400	4824758,0	1564334,0
SO_2 -1968,65	7700 / 3500	97814344,0	13973478,0
NO_2 -1968,65	3000 / 1500	65874966,0	12072633,0
Total	76700 / 16100	183676759	27768330,0

*Numerator - an indicator of old sinter plant; denominator - an indicator of a new sinter plant.

Enlarged economic damage caused by industrial emissions of pollutants into the atmosphere is determined by the formulas [1,2]:

$$У = \gamma \cdot \sigma \cdot f \cdot M, UAH / year;$$

$$M = \sum_{j=i}^{n} A_j \cdot m, = tones / \text{year}$$

The mass of old sinter plant emissions:

$$M_c = 100_{пил} \cdot 14000 + 16{,}5_{SO_2} \cdot 7700 + 41{,}1_{NO_2} \cdot 3000 = 1650305{,}0 \; cond.tons / year$$

The mass of emissions after the launch of a new sinter plant

$$M_н = 100_{пил} \cdot 700 + 16{,}5_{SO_2} \cdot 3500 + 41{,}1_{NO_2} 1500 \approx 189400{,}0 \; cond.tons / year$$

Reducing emissions reduced mass:

$G = M_c – M_н = 1650305 – 189400 = 1460905{,}0$ cond.tons/year

a) economic damage created by the old sinter plant:

$\sum У_c = У_п + У_г = 396084000 + 6008400 = 390075600{,}0$ UAH/year

b) economic loss after starting a new sinter plant:

$\sum У_н = У_п + У_г = 45456000 + 2865600 = 48321600{,}0$ UAH/year (10)

c) reducing the economic loss:

$E = E_c – E_н = 390075600 - 48321600 = 342054000{,}0$ UAH/year

The total environmental benefits of the release of a new sinter plant:

$\sum E = E_н + У_{ат} = 342054000 + 155908429 = 497962429{,}0$ UAH/year

Conclusions

1. Building a new sinter plant provides for: consistently high quality sinter and higher productivity.

2. Smaller desired area plant compared to conventional sinter plant.

3. Reducing the volume of waste gas by 50% and consumption of water from the Dnipro river.

4. The ability to utilize sinter plant more than 50 tons/year contaminated ferrous materials, low energy consumption and coke.

5. 70% reduction of harmful and organic components in the exhaust gases.

6. Significant savings in environmental costs associated with treatment and disposal by traditional technologies.

7. Compliance with all environmental requirements, even with their stricter in the future.

8. Reduction of initial concentration of harmful substances in exhaust gases sintering process; low emissions, including: dust <10 mg/Nm³; SOx <50 ppm/nm³; Dioxins <0.1 mg/Nm³; NOx <50 ppm/nm³; NOx content can be reduced to <50 ppm/nm³; a significant reduction in emissions of particles from the current 300-400 mg/nm³ at least 50 mg/nm³.

9. Reducing the economic damage is 155,908,429.0 UAH/year, and the total economic benefit is 497,962,429.0 UAH/year.

Due to this, will be significantly reduced not only the degree of pollution, and the resulting total erhonomo-economic benefit that is not only in the technical and economic effect as in a social effect - the preservation and increase duration of life.

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